

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,020,624

1,020,624



Date of Application and filing Complete Specification: Dec. 17, 1963.

No. 49858/63.

Application made in United States of America (No. 246928) on Dec. 26, 1962.

Complete Specification Published: Feb. 23, 1966.

© Crown Copyright 1966.

Index at Acceptance:—F2 Q(2B4,2H); B5 A(1R10, 1R14C2, 1R14D, 1R22X).

Int. Cl.:—F 06 g // B 29 d, f, g.

COMPLETE SPECIFICATION

Gear Belt

We, THE RUSSELL MANUFACTURING COMPANY, a Corporation organized and existing under the laws of the State of Connecticut, United States of America, of Middleton, Connecticut, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to gear belts and has for an object to provide an endless gear belt having novel and improved characteristics.

According to this invention, there is provided an endless gear belt molded from a synthetic plastics material or from natural or synthetic rubber, such belt comprising a backing portion with gear teeth integrally molded on one surface thereof, said backing portion having inner and outer layers of tension members embedded therein, one of said layers comprises a woven fabric sleeve having a filler yarn and warp yarns, said filler yarn being substantially uncrimped or non-undulating and extending helically around said belt, when this is disposed in circular form, to constitute a tension member, and said warp yarns extending transversely of the belt in crimped or undulating form to bind the filler yarn in place.

Further features of the invention will become apparent from the following description of a preferred embodiment, and a modification thereof, given by way of example with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a portion of the belt of this embodiment, with parts broken away for clarity;

Figure 2 is a detail illustrating the belt meshing with the teeth of a gear pulley;

Figure 3 is a transverse section through a mold core showing the tension members thereon prior to insertion into a mold for molding the belt;

Figure 4 is a perspective view of the fabric

sleeve which constitutes one of the tension members; and,

Figure 5 is a detail view, similar to Figure 2, illustrating a belt having a different arrangement of tension members.

Referring to the drawings more in detail the invention is shown as embodied in an endless belt having a backing portion 10 and teeth 11 molded as a unit from a synthetic plastics material, such as polyurethane, or from a natural or synthetic rubber composition. The belt includes a pair of tension members 12 and 13 which extend along the belt at a point spaced above the base 14 of the teeth and are embedded within the material, of the backing 10. The tension member 12 is in the form of a woven fabric sleeve having warp yarns 16 extending transversely of the belt. The weave is such that the warp yarns 16 are crimped or undulate as they pass over and under successive parts of a continuous filler yarn 15, which is so arranged as to be in the form of a helix when the belt is in circular form. The said successive parts of the filler yarn 15 are substantially uncrimped or non-undulating and extend generally longitudinally of the belt, not parallel to the side edges of the belt, but at an angle thereto because of the helical form of the filler yarn.

The second tension member 13 comprises a yarn 17 so wound around the fabric layer 12, also generally longitudinally of the belt, but at an angle to the side edges of the belt, as to form, when the belt is disposed in circular form, a helix having a pitch opposite to that of the filler yarn 15 of the fabric layer 12 so as to eliminate any tendency of the belt to creep sidewise on its pulleys.

The mold core for making the belt is shown in Figure 3 as comprising a tube 20 having a plurality of grooves 22 formed in the surface thereof, the grooves having a shape corresponding to that of the teeth 11 of the belt to be molded thereon and having ribs 23 between the grooves 22 corresponding in shape to the shape between the teeth 11 of the belt. The

ribs 23 are each formed with a pair of transversely sloping surfaces 24 intersecting in a ridge or peak 25. The sloping surfaces 24 form correspondingly sloping surfaces 26 between the teeth 11 of the belt for the purpose to be described.

For molding the belt a woven fabric sleeve 21 of the type above described is first placed over the core. The sleeve is preferably so woven that it fits tightly on the core or is slightly stretched in being so placed. This causes the filler yarn 15 to become substantially uncrimped or non-undulating and transfers the crimp to the warp yarns 16 which are of smaller denier than the filler yarn. Yarn 17 is then wound over the fabric sleeve to form a helical winding having a pitch opposite to that of the filler yarn 15 of the sleeve 21.

The core assembly is then placed in an outer mold of the type shown for example in U.S. Patent No. 2,983,637 and the belt tubing is molded under sufficient pressure to cause the molding material to flow through the interstices of the tension member and between the fabric sleeve 21 and the core surfaces to form a belt tube which is then sliced transversely into belts of the desired width.

Due to the ridges 25 of the mold and the thickness of the warp yarns 16 the tension members 15 are spaced above the surfaces 24 so that the molding material enters the space between such surfaces and the adjacent fabric to form wedge-shaped fillets 27 having sloping under surfaces 26 extending from the midpoint 28 of the space between teeth to the base 14 of the teeth. These fillets 27 cover the fabric sleeve except at the point 28 where the ridges 25 engage the sleeve 21.

The fillets 27 serve to space the tension members above the base of the teeth and also provide areas of increased resistance to flexing so that the fillets bend in the form of a smooth curve as the belt flexes around the cylindrical surface of a gear pulley as shown in Figure 2. Since the surfaces 26 slope in both directions from the centre point 28 the belt is free to bend around a small diameter gear pulley without binding or introducing excessive strains in the tension members.

The yarns 15 and 17 are preferably made of that material sold under the Registered Trade Mark "Dacron", a polyester of terephthalic acid and ethylene glycol, which has the property of bonding firmly to polyurethane, the warp yarns 16 may be made of other material such as cotton for economy.

Figure 2 illustrates the application of such a belt to a gear pulley having gear teeth 31 separated by grooves 32 into which the teeth 11 of the belt mesh. It will be noted that the

teeth 11 enter the grooves 32 to a depth such that the fillets 27 engage the outer peripheral surface of the gear pulley with the yarns 15 and 17 spaced above the belt dedendum circle by the depth of the fillets 27.

The embodiment of Figure 5 is similar to that above described except that the layer 13 of the yarn 17 is disposed below the fabric sleeve 21. The relative position of the tension members may be varied by altering the slope of the surfaces 24 and the thickness of the backing may be varied according to the load to which the belt is to be subjected.

WHAT WE CLAIM IS:—

1. An endless gear belt molded from a synthetic plastics material or from natural or synthetic rubber, such belt comprising a backing portion with gear teeth integrally molded on one surface thereof, said backing portion having inner and outer layers of tension members embedded therein, one of said layers comprises a woven fabric sleeve having a filler yarn and warp yarns, said filler yarn being substantially uncrimped or non-undulating and extending helically around said belt, when this is disposed in circular form, to constitute a tension member, and said warp yarns extending transversely of the belt in crimped or undulating form to bind the filler yarn in place.

2. An endless gear belt according to claim 1, wherein the other of said layers of tension members comprises a yarn extending helically around the belt when this is disposed in circular form.

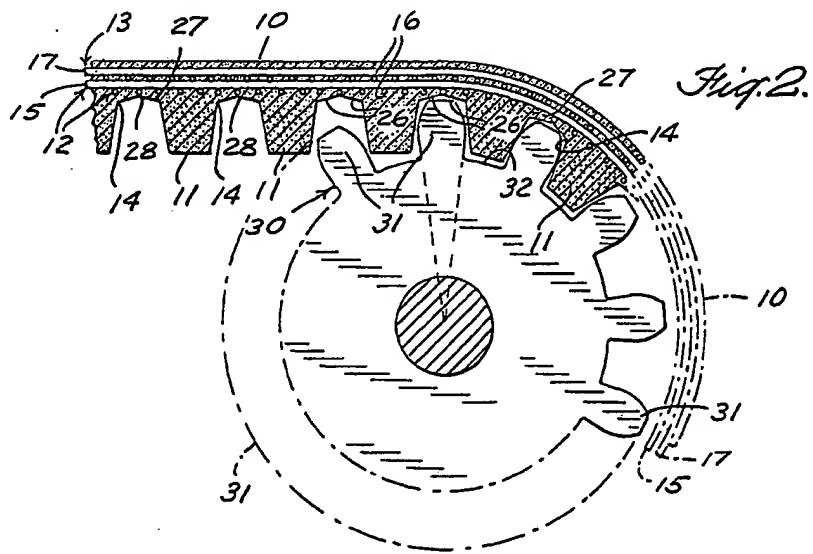
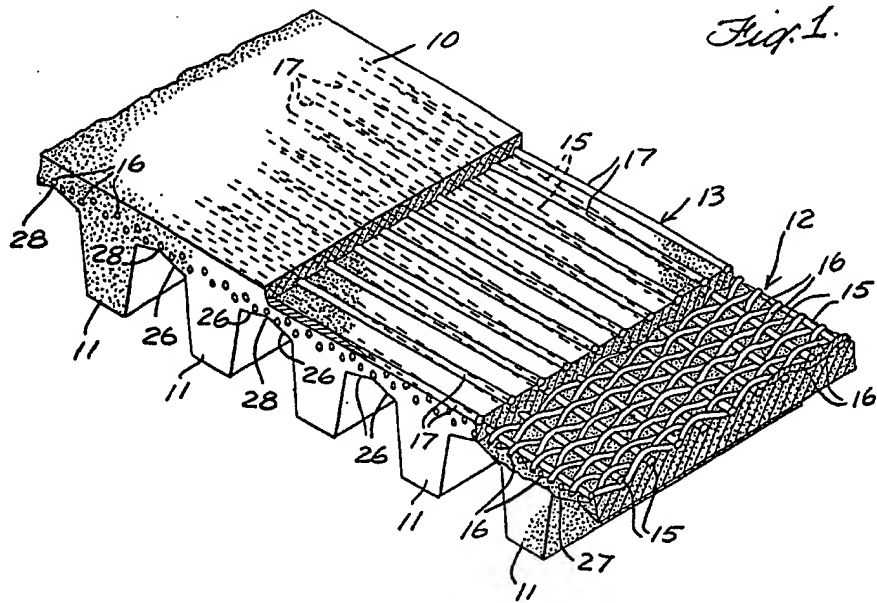
3. An endless gear belt according to claim 2, wherein the helical filler yarn of said first layer has a pitch direction opposite to that of said second layer.

4. An endless gear belt according to any of the preceding claims wherein said warp yarns are of smaller denier than said filler yarn.

5. An endless gear belt according to any of the preceding claims, wherein the inner tension member is spaced above the base of said teeth and a fillet of said molded material extends from the base of each tooth along the under surface of said inner tension member to about the midpoint of the space between teeth, said fillets being wedge-shaped and decreasing uniformly in thickness from the base of said teeth to said midpoint.

6. An endless gear belt substantially as hereinbefore described with reference to and as shown by Figures 1 to 4 or Figure 5 of the accompanying drawings.

J. A. KEMP & CO.,
Chartered Patent Agents,
14 South Square, Gray's Inn,
London, W.C.1.



1,020,624 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of
the Original on a reduced scale.
SHEETS 1 & 2

Fig. 1.



Fig. 3.

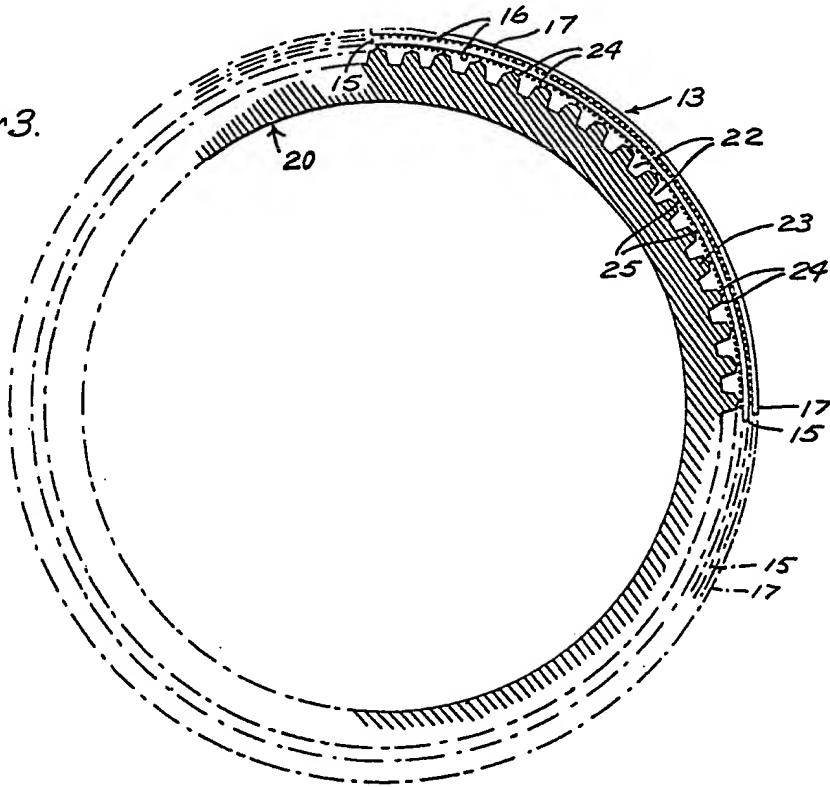


Fig. 2.

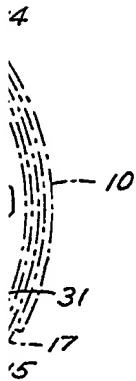


Fig. 4.

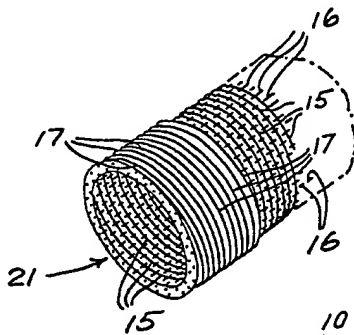
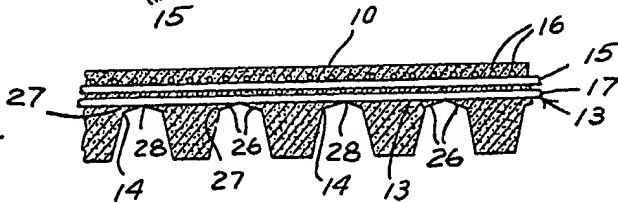
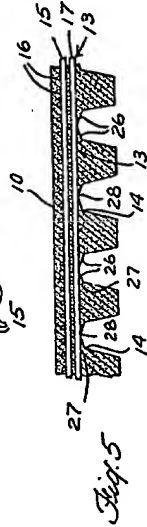
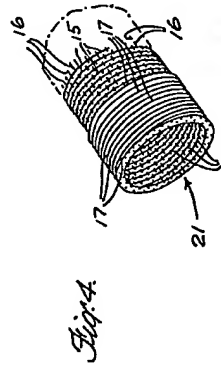
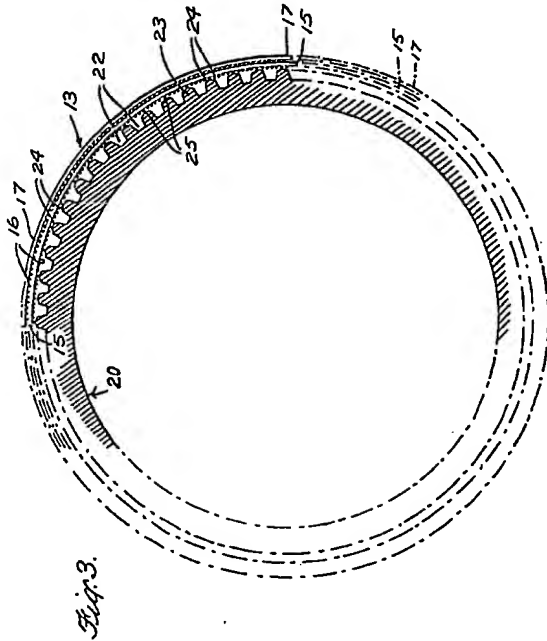
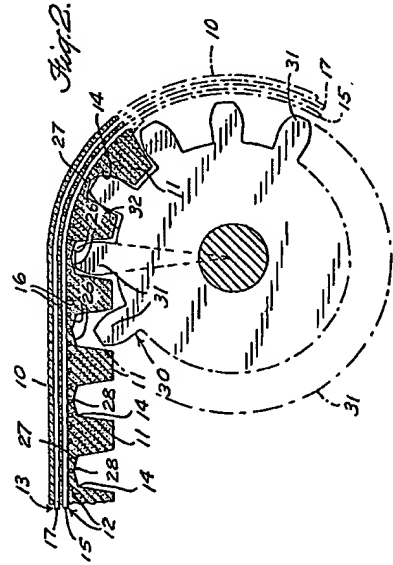
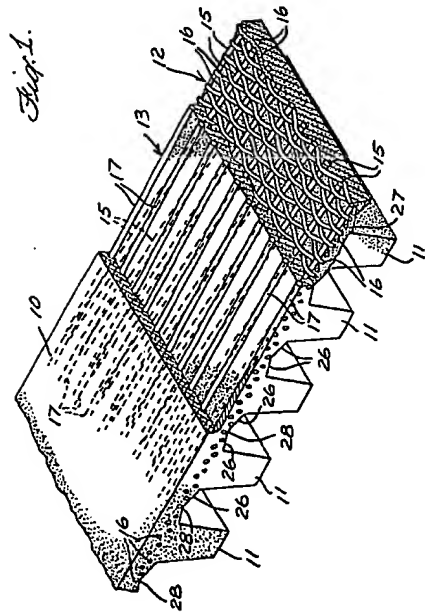


Fig. 5.



1,020,624 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of
the Original on a reduced scale.
SHEETS 1 & 2



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.